

REMARKS

This application has been reviewed in light of the Office Action dated October 21, 2003.

In a phone conversation on October 24, 2003, the Examiner indicated that the shortened statutory period for reply is set to expire 3 months from the date of mailing of the Office Action of October 21, 2003. Therefore, the present amendment is timely filed, and no fee is believed to be due.

Claims 1-20 are pending in the present application. Claims 1, 7 and 13 are independent.

Claims 1, 3, 5, 6, and 9-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Takase et al. (US 5,276,600) in view of Zhao et al. (US 6,382,816 B1).

Claims 2, 4, 7, and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Takase et al. (US 5,276,600) in view of Zhao et al. (US 6,382,816 B1), and further in view of Deloy (US 6,336,728 B1).

Claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Takase et al. (US 5,276,600) in view of Zhao et al. (US 6,382,816 B1) and further in view of Simpson (US 6,399,228 B1).

The applicants respectfully request reconsideration, for the following reasons.

The present invention is directed to, among other things, a liquid crystal display device, a side backlight unit, and a lamp reflector for use in a side backlight unit of a liquid crystal display, wherein the liquid crystal display includes a light guide plate including an incident surface and an emitting surface. The light guide plate is provided along the backside of the liquid crystal display panel wherein the emitting surface of said light guide plate faces toward the backside of the liquid crystal display panel. A lamp is disposed along the incident surface of the light guide plate, and is configured with a lamp reflector having an inner circumference surface defining a space for accommodating the lamp, and a light reflection layer is formed on the inner circumference surface. In a key aspect of the present invention, the lamp reflector further includes an arm portion disposed along the emitting surface of the light guide plate at the incident surface side of the light guide plate so that a light transmission

region is defined between the arm portion and the emitting surface, and the light transmission region has a thickness sufficiently small so that periodic bright lines on the liquid crystal display panel are at an inconspicuous intensity level. Support for this is found throughout the specification, for example at lines 15-17, page 18; lines 25-28, page 8; and lines 20-29, page 19. In particular, applicants have observed that by controlling the thickness of the light transmission region, the generation of periodic bright lines can be reduced or prevented (lines 15, page 18 continuing through line 19, page 19 and FIGs. 6 and 7). As discussed at lines 20-24, page 19, the light transmission region between the arms of the reflector body and the light guide plate may be occupied by a transparent layer or other layers capable of light transmission. The present invention is applicable both to light transmission regions between an upper or a lower arm and the guide plate (lines 25-29, page 19).

As understood, Takase et al. (US 5,276,600) discloses a curved reflector having a reflecting film 4, which can be used as a lamp house for a lamp which can be employed as a backlight for a liquid-crystal display panel (col. 1, lines 11-16) that may include a light guide plate 9 (col. 3, lines 39-52, and FIG. 4). Takase et al. further discloses a transparent protective layer on the side opposite to the high reflection layer (col. 4, lines 63-68). However, as acknowledged by the Examiner, Takase et al. fails to specify a thickness of the transparent protective film. In particular, Takase et al. fails to teach or suggest minimizing the thickness of a light transmission region defined between an arm portion and a surface of the light guide plate, so as to render inconspicuous bright lines on the .

Zhao et al. (US 6,382,816) is understood to disclose a reflector lamp with a parabolic shaped housing with an interior surface coated with a layer of silver and a protective silica oxide layer disposed thereon. However, Zhao et al. fails to teach or suggest, among other things, a light transmission region between an arm of a reflector body and a light guide plate having a thickness sufficiently small so that periodic bright lines on the liquid crystal display are at an inconspicuous intensity level. Therefore, one of ordinary skill would not be motivated to combine the teachings of Takase et al. with Zhao et al. to arrive at the present invention.

As understood, Deloy (US 6,336,728) discloses a luminaire for back lighting a flat panel display, including a lamp chassis 105 that supports a serpentine lamp 110, and a light guide 115 that has a planar section 310 and multiple protruding sections 320 adapted to fit between adjacent sections of lamp 110 and edges of flat panel display 110 (col. 2, lines 30-37). Light guide 115 enhances the luminance uniformity by capturing light at the lamp, through total internal reflection within light guide 115, and directing it forward over front surface 311 of the light guide (col. 4, lines 19-22, and FIG. 3B). Thus, Deloy fails to teach or suggest a side backlight unit in which a light transmission region defined between arms of the lamp reflector and the guide light plate has a thickness that is sufficiently small so that periodic bright lines are inconspicuous on the display, and one of ordinary skill would not be motivated to combine the teachings of Takase et al. with Zhao et al. and Deloy to arrive at the present invention.

As understood, Simpson (US 6,399,228) discloses a multi layer interference coating comprising at least one multi layer stack deposited on a reflective layer. However, Simpson fails to teach or suggest a light transmission region between arms of a reflective body and a light guide plate that has a thickness sufficiently small so that periodic bright lines are inconspicuous on a liquid crystal display. Thus, Simpson fails to overcome the deficiencies of Takase et al., Zhao et al., or Deloy, as discussed above, and therefore the combined teachings of Takase et al., Zhao et al., Deloy and Simpson do not render obvious the invention of claims 1, 7 and 13.

Applicants submit that independent claims 1, 7 and 13 are patentable over the prior art of record and are in condition for allowance. The other claims in this application are each dependent from one of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the applicants respectfully request favorable consideration and early passage to issue of the present application.

The applicants' undersigned attorney may be reached by telephone at (845) 894-6919.
All correspondence should continue to be directed to the below listed address.

Respectfully submitted,

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